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Dajer 9-3-29

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Application

Applicant(s): M. Dajer et al.
Case: 9-3-29
Serial No.: 09/420,275
Filing Date: October 18, 1999
Group: 2687
Examiner: Eliseo Ramos-Feliciano

Title: Multi-Carrier/Multi-Sector Channel Pooling in a Wireless Communication System Base Station

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TRANSMITTAL LETTER

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Submitted herewith is the following document relating to the above-identified patent application:

(1) Second Amended Appeal Brief.

There is no additional fee due in conjunction with this submission. In the event of any non-payment or improper payment of a required fee, the Commissioner is hereby authorized to charge or to credit **Ryan, Mason & Lewis, LLP Account No. 50-0762** as required to correct the error.

Respectfully submitted,

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Date: June 16, 2006

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I hereby certify that this paper is being deposited on this date with the U.S. Postal Service as first class mail addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Signature: Lisa L. Vulpis Date: June 16, 2006

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SECOND AMENDED APPEAL BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Applicants hereby appeal the final rejection dated June 3, 2005 of claims 1-27 of the above-identified application.

REAL PARTY IN INTEREST

The present application is assigned to Lucent Technologies Inc., as evidenced by an assignment recorded December 29, 1999 in the U.S. Patent and Trademark Office at Reel 010464, Frame 0625. The assignee Lucent Technologies Inc. is the real party in interest.

RELATED APPEALS AND INTERFERENCES

There are no known related appeals or interferences.

STATUS OF CLAIMS

The present application was filed on October 18, 1999 with claims 1-18. New claims 19-27 were added in a Preliminary Amendment filed by Applicants on August 30, 2000. Claims 1-27 are currently pending. Claims 1, 8, 15-20 and 24 are the independent claims.

Each of claims 1-27 stands rejected under 35 U.S.C. §103(a). Claims 1-27 are appealed.

STATUS OF AMENDMENTS

There have been no amendments filed subsequent to the final rejection.

SUMMARY OF CLAIMED SUBJECT MATTER

Independent claim 1 is directed to a base station for use in a code division multiple access (CDMA) wireless communication system. The base station comprises a plurality of channel unit boards each including a plurality of channel elements for providing processing operations for signals assigned to multiple carriers and multiple antenna sectors of the communication system. A given one of the channel elements of one of the channel unit boards is assignable to each of a plurality of carriers and a plurality of antenna sectors of the system.

FIG. 1 shows an example of a base station 100 with a plurality of channel unit boards 106. See the specification at page 1, lines 24-26. An illustrative embodiment of a particular channel unit board as recited in claim 1 is shown in FIG. 4, and comprises a base station channel unit board 200. The channel unit board 200 includes N channel elements 202-1, 202-2, . . . 202-N, also denoted CSM1 through CSMN, and a multi-carrier/multi-sector multiplexer 204. The multiplexer 204 allows each of the channel elements 202-j, j = 1, 2, . . . N, to be assigned to any carrier and sector available in the system backplane. The multiplexer 204 has inputs coupled to α, β and γ sector outputs from each of the channel elements 202-j. Each of the α, β and γ sector outputs in this embodiment includes I and Q signals for that sector. The multiplexer 204 can couple the sector outputs from the N channel elements to any one of up to N different carrier I/Q buses. The connection of α, β and γ sector outputs from each channel element 202-j to particular channel buses is determined by a multiplexer control signal applied to the multiplexer 204. See the specification at page 5, line 22 to page 7, line 11.

Dependent claims 3 and 10 further specify that at least one of the channel unit boards includes a multiplexer operative to connect a given one of the channel elements to an I and Q signal bus associated with a given one of the plurality of carriers. An example of such a multiplexer can be seen as multiplexer 204 in FIG. 4 of the drawings, which is a component of channel unit board 200. The multiplexer 204 can couple sector outputs from the N channel elements 202 to any one of up to N different carrier I/Q buses. See the specification at, for example, page 5, line 24, to page 6, line 6.

Dependent claims 4 and 11 further specify that the I and Q signals generated for a given one of the carriers by a given one of the channel unit boards are combined within another of the channel units boards with the I and Q signals generated for the given carrier by the other channel unit board. An example of an arrangement of this type is shown in FIG. 5, where a combiner 230 combines I and Q signals from one channel unit board, that is, channel unit board 200 comprising channel elements 202, with I and Q signals from other channel unit boards as supplied via an upstream I/Q bus 231. See the specification at, for example, page 7, lines 12-27.

Dependent claims 6 and 13 further recite a control computer operative to generate one or more control signals for controlling assignment of the channel elements of the channel unit boards to the plurality of carriers of the system. An example of a conventional control computer is shown as control computer 102 in the base station 100 of FIG. 1. The specification at page 6, lines 11-12, indicates that such a control computer can be modified to generate a control signal for multiplexer 204 in the FIG. 4 embodiment, so as to control assignment of channel elements 202 of channel unit board 200 to carriers or sectors.

Independent claim 8 is directed to a method of implementing a base station of a type similar to that recited in claim 1. An illustrative embodiment of a channel unit board as recited in claim 8 is shown as channel unit board 200 in FIG. 4, previously described above. See the specification at page 5, line 22 to page 7, line 11.

Independent claim 15 is directed to an article of manufacture comprising a machine-readable storage medium for use in configuring a base station of type similar to that recited in claim 1. An illustrative embodiment of a channel unit board as recited in claim 8 is shown as channel unit board 200 in FIG. 4, previously described above. See the specification at page 5, line 22 to page 7, line 11.

Independent claim 16 is directed to a base station for use in a CDMA wireless communication system. Like claim 1, claim 16 specifies that the base station comprises a plurality of channel unit boards each including a plurality of channel elements for providing processing operations for signals assigned to multiple carriers and multiple antenna sectors of the communication system, with a given one of the channel elements of one of the channel unit boards being assignable to each of a plurality of carriers and a plurality of antenna sectors of the system. Claim 16 further recites a control computer coupled to the plurality of channel unit boards, with the control computer being operative to assign the channel elements of the channel unit boards to particular ones of the carriers and antenna sectors of the system. An illustrative embodiment of a channel unit board as recited in claim 16 is shown as channel unit board 200 in FIG. 4, previously described above. See the specification at page 5, line 22 to page 7, line 11. A base station 100 with multiple channel unit boards 106 and a control computer 102 is shown in FIG. 1. See the specification at page 1, lines 24-26.

Independent claim 17 is directed to a base station for use in a CDMA wireless communication system. The base station comprises a plurality of channel elements for providing processing operations for signals assigned to multiple carriers and multiple antenna sectors of the communication system, and a multiplexer operative to assign signals from a given one of the channel elements to each of a plurality of carriers and a plurality of antenna sectors of the system, so as to implement a multi-carrier multi-sector channel pooling arrangement. An illustrative embodiment comprises a base station channel unit board 200 as shown in FIG. 4. The channel unit board 200 includes N channel elements 202-1, 202-2, . . . 202-N, also denoted CSM1 through CSMN, and a multi-carrier/multi-sector multiplexer 204. See the specification at page 5, line 22 to page 7, line 11.

Independent claim 18 is directed to a method of implementing a base station for use in a CDMA wireless communication system, where the base station comprises a plurality of channel elements for providing processing operations for signals assigned to a plurality of carriers and a plurality of antenna sectors of the communication system. The method includes the steps of controllably assigning the channel elements to designated ones of the plurality of carriers and the plurality of antenna sectors of the system, so as to implement a multi-carrier multi-sector channel pooling arrangement. The claim further specifies that a given one of the channel elements is

assignable to each of the plurality of carriers and the plurality of antenna sectors of the system. An illustrative embodiment comprises a base station channel unit board 200 as shown in FIG. 4. The channel unit board 200 includes N channel elements 202-1, 202-2, . . . 202-N, also denoted CSM1 through CSMN, and a multi-carrier/multi-sector multiplexer 204. See the specification at page 5, line 22 to page 7, line 11.

Independent claim 19 is directed to a base station for use in a CDMA wireless communication system. The base station comprises a plurality of channel unit boards each including a plurality of channel elements for providing processing operations for signals transmitted by the system, and a controllable signal combiner element coupled to the plurality of channel unit boards. The controllable signal combiner element implements an assignment of signals from each of the channel elements of a given one of the channel unit boards for transmission on one or more of a plurality of carriers and a plurality of antenna sectors of the system. The claim further specifies that a given one of the channel elements of the given channel unit board is assignable to each of the plurality of carriers and the plurality of antenna sectors of the system. An illustrative embodiment comprises a base station channel unit board 200 as shown in FIG. 4. The channel unit board 200 includes N channel elements 202-1, 202-2, . . . 202-N, also denoted CSM1 through CSMN. FIG. 5 shows the N channel elements 202-1, 202-2, . . . 202-N coupled to a controllable signal combiner element comprising combiners 225 and 230. See the specification at page 5, line 22 to page 7, line 27.

Dependent claim 20 further defines the controllable signal combiner element as comprising a set of controllable signal combiners associated with a given one of the channel unit boards and each having a plurality of inputs, with each of the inputs coupled to an output of a particular one of the plurality of channel elements of the given channel unit board, and a multi-carrier combiner having a plurality of inputs, with each of the inputs coupled to an output of a corresponding one of the controllable signal combiners, the multi-carrier combiner further having an additional input coupled to a bus output of another of the plurality of channel unit boards, and generating a set of outputs on a system transmit bus. An example can be seen in the illustrative embodiment of FIG. 5, which shows how the N channel elements 202 of the channel unit board 200 can be combined in the transmit direction, using a set of N controllable signal combiners 225 and a multi-carrier combiner 230. The multi-carrier combiner 230 receives as inputs the outputs of the N controllable

signal combiners 225, and also receives as an input the upstream I/Q bus 231 which comes from an upstream channel unit board. See the specification at, for example, page 7, lines 12-27.

Dependent claim 23 further recites a control computer operative to generate one or more control signals for application to the controllable signal combiners and the multi-carrier combiner so as to control assignment of each of at least a subset of the channel elements of the given channel unit board to one or more of the plurality of carriers of the system. An example of a conventional control computer is shown as control computer 102 in the base station 100 of FIG. 1. The specification at page 6, lines 11-12, indicates that such a control computer can be modified to generate a control signal for multiplexer 204 in the FIG. 4 embodiment, so as to control assignment of channel elements 202 of channel unit board 200 to carriers or sectors. The controllable signal combiners 225 and multi-carrier combiner 230 as shown in the illustrative embodiment of FIG. 5 may represent elements of the multiplexer 204 of the FIG. 4 embodiment. See the specification at page 7, lines 1-3 and 26-27.

Independent claim 24 is directed to a base station for use in a CDMA wireless communication system. The base station comprises a plurality of channel unit boards each including a plurality of channel elements for providing processing operations for signals received by the system, and a controllable selector associated with a given one of the channel unit boards and receiving as inputs a set of signals associated with a receive bus of the system, the controllable selector having a plurality of outputs, each coupled to a corresponding input of one of the channel elements of the given channel unit board. The controllable selector implements an assignment of received signals from each of a plurality of carriers and a plurality of antenna sectors of the system to one or more of the channel elements of the given channel unit board. A given one of the channel elements of the given channel unit board is assignable to each of the plurality of carriers and the plurality of antenna sectors of the system. An illustrative embodiment is shown in FIGS. 6A and 6B, where a given one of a plurality of channel unit boards 200 comprises N channel elements 202-1, 202-2, . . . 202-N, also denoted CSM1 through CSMN, that are each coupled to a controllable selector 240. See the specification at page 5, line 22 to page 7, line 11, and page 7, line 28, to page 8, line 10.

Dependent claim 27 further recites a control computer operative to generate one or more control signals for application to the controllable selector so as to control assignment of the received

signals from each of the plurality of carriers of the system to each of at least a subset of the channel elements of the given channel unit board. An example of a conventional control computer is shown as control computer 102 in the base station 100 of FIG. 1. The specification at page 8, lines 7-10, indicates that an I/Q routing control signal is generated for application to a controllable selector 240 so as to control assignment of received signals to channel elements of a given channel unit board 200, as shown in FIG. 6A. The routing control signal can be provided by an otherwise conventional control computer.

The independent claims are thus generally directed to various multiple-carrier, multiple-sector channel pooling arrangements in which a given base station channel element, which may be part of a plurality of such elements on a channel unit board, is assignable to each of a plurality of carriers and a plurality of antenna sectors of the system.

The illustrative multi-carrier multi-sector channel pooling arrangement shown in FIG. 4 is distinct from the conventional channel pooling arrangements of the prior art. The latter arrangements are described at page 1, line 24 to page 4, line 8 of the specification, in conjunction with FIGS. 1 to 3 of the drawings. The multi-carrier multi-sector channel pooling arrangement in the illustrative embodiment of FIG. 4 provides numerous advantages relative to such conventional channel pooling, particularly in terms of increased system flexibility and reliability. See the specification at, for example, page 8, lines 14-24.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1-27 stand rejected under 35 U.S.C. §103(a) over U.S. Patent No. 6,400,966 (hereinafter "Andersson").

ARGUMENT

Claims 1, 2, 5, 7-9, 12, 14 and 15

A proper *prima facie* case of obviousness over a single reference requires some suggestion or motivation, either in the reference itself or in the knowledge generally available to one of ordinary skill in the art, to modify the reference teachings to reach the claimed invention. See Manual of Patent Examining Procedure (MPEP), Eighth Edition, August 2001, §706.02(j).

Applicants submit that the Examiner has failed to establish a proper *prima facie* case of obviousness in the present §103(a) rejection of independent claims 1, 8 and 15, in that the Andersson reference fails to teach or suggest all the claim limitations, and in that no cogent motivation has been identified for modifying the reference teachings to reach the claimed invention. Further, even if it is assumed that a proper *prima facie* case has been established, there are particular teachings in the Andersson reference which controvert the obviousness argument put forth by the Examiner.

As was described previously herein, independent claim 1 recites an arrangement in which a given channel element of a given channel unit board is assignable to each of a plurality of carriers and a plurality of antenna sectors of a CDMA system.

In rejecting claim 1 under §103(a), the Examiner relies at least in part on FIG. 9A of Andersson, arguing that a given claimed channel unit board corresponds to element BBTX 1, and that the channel elements of that channel unit board correspond to the boxes labeled "Carrier 1" and "Carrier N1" in BBTX 1. See the Office Action at, for example, pages 2-3. However, as Applicants have pointed out in their previous responses, none of the boxes labeled "Carrier 1" or "Carrier N1" in FIG. 9A, which the Examiner argues correspond to the claimed channel elements, is assignable to each of a plurality of carriers and a plurality of antenna sectors of the Andersson system. Instead, it is clear that each of the boxes labeled "Carrier 1" or "Carrier N1" in FIG. 9A of Andersson is associated with only a single carrier of the Andersson system. That is, the "Carrier 1" box is associated with Carrier 1, the "Carrier N1" box is associated with Carrier N1, and so on.

In response to the previous argument of Applicants on this point, the Examiner acknowledges at page 3 of the Office Action that FIG. 9A fails to meet the limitation of claim 1 regarding a given channel element of a given channel unit board being assignable to each of a plurality of carriers and a plurality of antenna sectors of the system. However, the Examiner goes on to argue that FIG. 9A is described in Andersson as one of a number of "alternative embodiments" that can "be used interchangeably," and that Andersson describes other embodiments which meet the limitation in question, relying on teachings in column 5, lines 50-51, and column 7, lines 30-34. Applicants respectfully submit that the Examiner is incorrect on this point.

Even a cursory reading of Andersson makes it readily apparent that FIG. 9A and the relied-upon additional teachings refer to the same embodiment. For example, Andersson explicitly describes FIG. 9A as follows in the brief description provided at column 3, lines 3-6:

FIGS. 9A and 9B are diagrams that illustrate the flexible allocation of signal processing resources utilizing the interfaces B'_2 and A'_2 shown in FIG. 2, in accordance with the preferred embodiment of the present invention.

Thus, FIG. 9A is a further illustration of the manner in which interfaces B'_2 and A'_2 of FIG. 2 are implemented in the single "preferred embodiment" described in Andersson. FIGS. 2 and 9A are thus not "alternative embodiments" that can "be used interchangeably," as alleged by the Examiner. Instead, FIG. 9A is simply a more detailed view of particular portions of the preferred embodiment shown in FIG. 2, namely, the hardware associated with the B'_2 and A'_2 interface portions of the FIG. 2 embodiment. The above-noted additional teachings relied upon by the Examiner, at column 5, lines 50-51, and column 7, lines 30-34, clearly relate to FIG. 2 embodiment, which as noted above is the very same embodiment which is further detailed by FIG. 9A. This is consistent with references at column 3, lines 16-19, and column 10, lines 23-30, of Andersson which refer to a single "preferred embodiment," rather than multiple interchangeable alternative embodiments as alleged by the Examiner.

Applicants therefore submit that the additional teachings at column 5, lines 50-51, and column 7, lines 30-34, of Andersson fail to supplement the fundamental deficiency of FIG. 9A as applied to the limitations of independent claim 1. There is simply no channel unit board in Andersson which includes multiple channel elements at least a given one of which is assignable to multiple carriers and sectors as claimed. FIG. 9A details the interfaces B'_2 and A'_2 of FIG. 2, and the Examiner has acknowledged that the arrangement shown in FIG. 9A fails to meet the claim limitations. It is believed that none of the hardware associated with the remaining interfaces A'_1 and B'_1 meets these limitations. There is no support whatsoever in Andersson for the modification of FIG. 9A that is proposed by the Examiner, and FIG. 9A in fact teaches away from the proposed modification.

Applicants further note that the Examiner has not provided any objective evidence of motivation to modify Andersson to meet the claimed arrangement. The Federal Circuit has stated that when patentability turns on the question of obviousness, the obviousness determination "must be based on objective evidence of record" and that "this precedent has been reinforced in myriad decisions, and cannot be dispensed with." In re Sang-Su Lee, 277 F.3d 1338, 1343 (Fed. Cir. 2002).

Moreover, the Federal Circuit has stated that "conclusory statements" by an examiner fail to adequately address the factual question of motivation, which is material to patentability and cannot be resolved "on subjective belief and unknown authority." Id. at 1343-1344.

The only statements of motivation provided in the final Office Action are conclusory in nature, and hence insufficient to support a *prima facie* case. For example, at page 3, fourth paragraph, the Examiner states that the arrangement set forth in claim 1 would be obvious in order to provide "the advantage of cost-effective hardware implementation by minimizing hardware size for a given radio transmission service mix." The problem with this statement is that it uses an advantage of the present invention as motivation for the allegedly obvious modification of Andersson, which is clearly improper. Moreover, the Andersson reference itself, by teaching to use a technique which is directly contrary to that claimed, actively teaches away from the limitations in question. Accordingly, the obviousness rejection is believed to be improper, and should be withdrawn.

Independent claims 8 and 15 include limitations similar to those of claim 1, and are therefore believed allowable for reasons similar to those identified above.

Dependent claims 2, 5, 7, 9, 12 and 14 are believed allowable for at least the reasons identified above with regard to their respective independent claims.

Claims 3 and 10

Dependent claims 3 and 10 further specify that at least one of the channel unit boards includes a multiplexer operative to connect a given one of the channel elements to an I and Q signal bus associated with a given one of the plurality of carriers. The Examiner relies on the teachings in FIGS. 4B, 7B and 9A of Andersson, but these arrangements fail to meet the limitation in question. For example, as noted above, the Examiner apparently argues that a given claimed channel unit board corresponds to element BBTX 1 of FIG. 9A, and that the channel elements of that channel unit board correspond to the boxes labeled "Carrier 1" and "Carrier N1" in BBTX 1. However, the multiplexer of BBTX1 is not operative to connect a given one of the channel elements to an I and Q signal bus associated with a given one of the plurality of carriers. Instead, it appears to combine signals from multiple channel elements, each associated with a single carrier, onto a single common

bus, which fails to meet the limitation in question. In addition, no objective evidence of motivation to modify Andersson to meet this particular limitation is identified.

Claims 4 and 11

Dependent claims 4 and 11 further specify that the I and Q signals generated for a given one of the carriers by a given one of the channel unit boards are combined within another of the channel units boards with the I and Q signals generated for the given carrier by the other channel unit board. The Examiner again relies on FIGS. 4B, 7B and 9A of Andersson, alleging that a given claimed channel unit board corresponds to element BBTX 1 of FIG. 9A, and that the channel elements of that channel unit board correspond to the boxes labeled "Carrier 1" and "Carrier N1" in BBTX 1. However, if this is the case, there is no combining of I and Q signals for one carrier on one channel board with other I and Q signals within another channel unit board. In addition, no objective evidence of motivation to modify Andersson to meet this particular limitation is identified.

Claims 6 and 13

Dependent claims 6 and 13 further recite a control computer operative to generate one or more control signals for controlling assignment of the channel elements of the channel unit boards to the plurality of carriers of the system. It is believed that there is no control computer of this type in Andersson, in that Andersson does not assign channel elements of channel element boards to different carriers of the system. Instead, as indicated previously, Andersson discloses an arrangement in which each of the "Carrier 1" through "Carrier N1" elements of BBTX 1 in FIG. 9A is associated with a single carrier. Since there is no assignment of channel elements of channel unit boards to carriers in Andersson, there is no control computer which is operative to generate control signals for controlling such an assignment. In addition, no objective evidence of motivation to modify Andersson to meet this particular limitation is identified.

Claim 16

Independent claim 16 recites a base station comprising a plurality of channel unit boards each including a plurality of channel elements, as set forth in claim 1. Claim 16 further calls for a control computer coupled to the plurality of channel unit boards, the control computer being

operative to assign the channel elements of the channel unit boards to particular ones of the carriers and antenna sectors of the system. The Examiner again relies on FIGS. 4B, 7B and 9B of Andersson, but as described above, these relied-upon arrangements fail to teach or suggest a particular channel element of a channel unit board that is assignable to each of a plurality of carriers and a plurality of sectors of the system. Since Andersson fails to provide any such teaching regarding assignability of a channel element of a channel unit board, it fails to teach or suggest a control computer coupled to a plurality of channel boards for controlling the assignability of the channel elements thereof. In addition, no objective evidence of motivation to modify Andersson to meet this particular limitation is identified.

Claim 17

Independent claim 17 recites a base station comprising a plurality of channel elements for providing processing operations for signals assigned to multiple carriers and multiple antenna sectors of the communication system, and a multiplexer operative to assign signals from a given one of the channel elements to each of a plurality of carriers and a plurality of antenna sectors of the system, so as to implement a multi-carrier multi-sector channel pooling arrangement. The Examiner again relies on the arrangement shown in FIG. 9A of Andersson, but this arrangement apparently associates each of the "Carrier 1" through "Carrier N1" elements with a corresponding single carrier frequency. Thus, there is no multiplexer which operates in the manner recited, and no multi-carrier multi-sector channel pooling, in the relied-upon portions of Andersson. In addition, the Examiner has failed to identify objective evidence of motivation to modify Andersson to meet the limitations of claim 17.

Claim 18

Independent claim 18 recites controllably assigning channel elements of a base station to designated ones of the plurality of carriers and the plurality of antenna sectors of the system, so as to implement a multi-carrier multi-sector channel pooling arrangement, wherein a given one of the channel elements is assignable to each of the plurality of carriers and the plurality of antenna sectors of the system. The Examiner yet again relies on FIG. 9A of Andersson, which as noted previously

fails to allow any particular channel element to be assigned to each of a plurality of carriers and a plurality of sectors, and fails to provide a multi-carrier multi-sector channel pooling arrangement. In addition, the Examiner has failed to identify objective evidence of motivation to modify Andersson to meet the limitations of claim 18.

Claims 19, 21 and 22

Independent claim 19 recites a base station having a plurality of channel unit boards each including a plurality of channel elements for providing processing operations for signals transmitted by the system, and a controllable signal combiner element coupled to the plurality of channel unit boards. The controllable signal combiner element implements an assignment of signals from each of the channel elements of a given one of the channel unit boards for transmission on one or more of a plurality of carriers and a plurality of antenna sectors of the system. Further, a given one of the channel elements of the given channel unit board is assignable to each of the plurality of carriers and the plurality of antenna sectors of the system. The Examiner characterizes this claim as "an obvious variation form of claims 1-18," and rejects the claim relying yet again primarily on the FIG. 9A arrangement of Andersson. As indicated elsewhere herein, the FIG. 9A arrangement fails to show any particular channel element of the given channel unit board that is assignable to each of the plurality of carriers and the plurality of antenna sectors of the system, and in fact teaches away from such an assignability. Accordingly, Andersson fails to teach or suggest a controllable signal combiner of the particular type recited. In addition, no objective evidence of motivation to modify Andersson to meet the particular limitations of claim 19 is identified.

Dependent claims 21 and 22 are believed allowable for at least the reasons identified above with regard to independent claim 19.

Claim 20

Dependent claim 20 further defines the controllable signal combiner element as comprising a set of controllable signal combiners associated with a given one of the channel unit boards and each having a plurality of inputs, with each of the inputs coupled to an output of a particular one of the plurality of channel elements of the given channel unit board, and a multi-carrier combiner having a plurality of inputs, with each of the inputs coupled to an output of a corresponding one of

the controllable signal combiners, the multi-carrier combiner further having an additional input coupled to a bus output of another of the plurality of channel unit boards, and generating a set of outputs on a system transmit bus. The Examiner argues that these arrangements are obvious in view of FIGS. 9A and 12 of Andersson, but Applicants respectfully submit that these relied-upon arrangements fail to meet the particular limitations in terms of the connectivity and operation of the controllable signal combiner and multi-carrier combiner elements. In addition, the Examiner has failed to identify any objective evidence of motivation to modify Andersson to meet the limitations of claim 20.

Claim 23

Dependent claim 23 further recites a control computer operative to generate one or more control signals for application to the controllable signal combiners and the multi-carrier combiner so as to control assignment of each of at least a subset of the channel elements of the given channel unit board to one or more of the plurality of carriers of the system. The Examiner again relies on FIG. 9A of Andersson, but there is simply no controllable assignment of channel elements to carriers provided in that relied-upon arrangement. Accordingly, Andersson fails to teach or suggest a control computer of the type recited. In addition, no objective evidence of motivation to modify Andersson to meet this particular limitation is identified.

Claims 24, 25 and 26

Independent claim 24 recites a plurality of channel unit boards each including a plurality of channel elements for providing processing operations for received signals. A controllable selector is associated with a given one of the channel unit boards and receives as inputs a set of signals associated with a receive bus of the system. The controllable selector has a plurality of outputs, each coupled to a corresponding input of one of the channel elements of the given channel unit board. The controllable selector implements an assignment of received signals from each of a plurality of carriers and a plurality of antenna sectors of the system to one or more of the channel elements of the given channel unit board. Finally, the claim specifies that a given one of the channel elements of the given channel unit board is assignable to each of the plurality of carriers and the plurality of antenna sectors of the system. The Examiner relies on FIGS. 3-12 of Andersson, but there is no

teaching or suggestion in these relied-upon arrangements regarding a controllable selector having the particular inputs, outputs, connectivity and operation recited in the claim. In fact, certain of these relied-upon portions of Andersson, such as the FIG. 9A arrangement described previously, actively teach away from the controllable assignability of a channel element as recited in this particular claim. Furthermore, Applicants note that the Examiner has failed to identify objective evidence of motivation to modify Andersson to meet the limitations of claim 24.

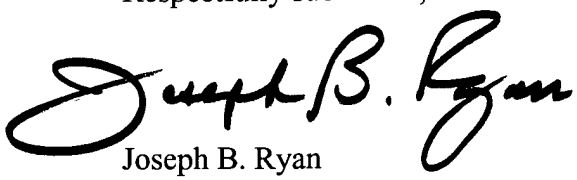
Dependent claims 25 and 26 are believed allowable for at least the reasons identified above with regard to independent claim 24.

Claim 27

Dependent claim 27 further recites a control computer operative to generate one or more control signals for application to the controllable selector so as to control assignment of the received signals from each of the plurality of carriers of the system to each of at least a subset of the channel elements of the given channel unit board. The Examiner relies on FIGS. 3-12 of Andersson, but there is simply no controllable assignment of channel elements to carriers provided in the relied-upon portions of the reference. Accordingly, Andersson fails to teach or suggest a control computer of the type recited. In addition, no objective evidence of motivation to modify Andersson to meet this particular limitation is identified.

In view of the above, Applicants believe that claims 1-27 are in condition for allowance, and respectfully request the withdrawal of the §103(a) rejection.

Respectfully submitted,



Date: June 16, 2006

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CLAIMS APPENDIX

1. A base station for use in a code division multiple access wireless communication system, comprising:

a plurality of channel unit boards each including a plurality of channel elements for providing processing operations for signals assigned to multiple carriers and multiple antenna sectors of the communication system, wherein a given one of the channel elements of one of the channel unit boards is assignable to each of a plurality of carriers and a plurality of antenna sectors of the system.

2. The base station of claim 1 wherein each of the channel unit boards generates a set of digital in-phase (I) and quadrature (Q) signals for each of the plurality of carriers.

3. The base station of claim 2 wherein at least one of the channel unit boards includes a multiplexer operative to connect a given one of the channel elements to an I and Q signal bus associated with a given one of the plurality of carriers.

4. The base station of claim 3 wherein the I and Q signals generated for a given one of the carriers by a given one of the channel unit boards is combined within another of the channel units boards with the I and Q signals generated for the given carrier by the other channel unit board.

5. The base station of claim 1 wherein each of at least a subset of the channel unit boards includes a total of N channel elements, and each of the channel elements may be assigned to one of up to N carriers of the system.

6. The base station of claim 1 further including a control computer operative to generate one or more control signals for controlling assignment of the channel elements of the channel unit boards to the plurality of carriers of the system.

7. The base station of claim 1 wherein the code division multiple access wireless communication system is operative in accordance with at least one of an IS-95A standard, an IS-95B standard, an IS-95C standard with Orthogonal Transmit Diversity (OTD), an IS-95C standard without OTD, a Multi-Carrier (MC) cdma2000 standard, and a Universal Mobile Telecommunications System (UMTS) standard.

8. A method of implementing a base station for use in a code division multiple access wireless communication system, the base station comprising a plurality of channel unit boards each including a plurality of channel elements for providing processing operations for signals assigned to a plurality of carriers and a plurality of antenna sectors of the communication system, the method comprising the step of:

controllably assigning the channel elements of at least one of the channel unit boards to designated ones of the plurality of carriers and the plurality of antenna sectors of the system, such

that different channel elements of the channel unit board are assigned to different carriers and different antenna sectors of the system;

wherein a given one of the channel elements of the channel unit board is assignable to each of the plurality of carriers and the plurality of antenna sectors of the system.

9. The method of claim 8 wherein each of the channel unit boards generates a set of digital I and Q signals for each of the plurality of carriers.

10. The method of claim 9 wherein at least one of the channel unit boards includes a multiplexer operative to connect a given one of the channel elements to an I and Q signal bus associated with a given one of the plurality of carriers.

11. The method of claim 10 wherein the I and Q signals generated for a given one of the carriers by a given one of the channel unit boards is combined within another of the channel units boards with the I and Q signals generated for the given carrier by the other channel unit board.

12. The method of claim 8 wherein each of at least a subset of the channel unit boards includes a total of N channel elements, and each of the channel elements may be assigned to one of up to N carriers of the system.

13. The method of claim 8 wherein the assigning step is implemented at least in part using a control computer operative to generate one or more control signals for controlling assignment of the channel elements of the channel unit boards to the plurality of carriers of the system.

14. The method of claim 8 wherein the code division multiple access wireless communication system is operative in accordance with at least one of an IS-95A standard, an IS-95B standard, an IS-95C standard with OTD, an IS-95C standard without OTD, an MC cdma2000 standard, and a UMTS standard.

15. An article of manufacture comprising a machine-readable storage medium for storing one or more programs for use in configuring a base station of a code division multiple access wireless communication system, the base station comprising a plurality of channel unit boards each including a plurality of channel elements for providing processing operations for signals assigned to multiple carriers and multiple antenna sectors of the communication system, the one or more programs when executed implementing the step of:

controllably assigning the channel elements of at least one of the channel unit boards to designated ones of the plurality of carriers and the plurality of antenna sectors of the system, such that different channel elements of the channel unit board are assigned to different carriers and different antenna sectors of the system;

wherein a given one of the channel elements of the channel unit board is assignable to each of the plurality of carriers and each of the plurality of antenna sectors of the system.

16. A base station for use in a code division multiple access wireless communication system, comprising:

a plurality of channel unit boards each including a plurality of channel elements for providing processing operations for signals assigned to multiple carriers and multiple antenna sectors of the communication system, wherein a given one of the channel elements of one of the channel unit boards is assignable to each of a plurality of carriers and a plurality of antenna sectors of the system; and

a control computer coupled to the plurality of channel unit boards, the control computer being operative to assign the channel elements of the channel unit boards to particular ones of the carriers and antenna sectors of the system.

17. A base station for use in a code division multiple access wireless communication system, comprising:

a plurality of channel elements for providing processing operations for signals assigned to multiple carriers and multiple antenna sectors of the communication system; and

a multiplexer operative to assign signals from a given one of the channel elements to each of a plurality of carriers and a plurality of antenna sectors of the system, so as to implement a multi-carrier multi-sector channel pooling arrangement.

18. A method of implementing a base station for use in a code division multiple access wireless communication system, the base station comprising a plurality of channel elements for

providing processing operations for signals assigned to a plurality of carriers and a plurality of antenna sectors of the communication system, the method comprising the step of:

controllably assigning the channel elements to designated ones of the plurality of carriers and the plurality of antenna sectors of the system, so as to implement a multi-carrier multi-sector channel pooling arrangement;

wherein a given one of the channel elements is assignable to each of the plurality of carriers and the plurality of antenna sectors of the system.

19. A base station for use in a code division multiple access wireless communication system, comprising:

a plurality of channel unit boards each including a plurality of channel elements for providing processing operations for signals transmitted by the system; and

a controllable signal combiner element coupled to the plurality of channel unit boards;

wherein the controllable signal combiner element implements an assignment of signals from each of the channel elements of a given one of the channel unit boards for transmission on one or more of a plurality of carriers and a plurality of antenna sectors of the system;

wherein a given one of the channel elements of the given channel unit board is assignable to each of the plurality of carriers and the plurality of antenna sectors of the system.

20. The base station of claim 19 wherein the controllable signal combiner element further comprises:

a set of controllable signal combiners associated with a given one of the channel unit boards and each having a plurality of inputs, with each of the inputs coupled to an output of a particular one of the plurality of channel elements of the given channel unit board; and

a multi-carrier combiner having a plurality of inputs, with each of the inputs coupled to an output of a corresponding one of the controllable signal combiners, the multi-carrier combiner further having an additional input coupled to a bus output of another of the plurality of channel unit boards, and generating a set of outputs on a system transmit bus.

21. The base station of claim 19 wherein each of the channel unit boards generates a set of digital in-phase (I) and quadrature (Q) signals for each of the plurality of carriers.

22. The base station of claim 19 wherein each of at least a subset of the channel unit boards includes a total of N channel elements, and each of the channel elements may be assigned to one of up to N carriers of the system.

23. The base station of claim 19 further including a control computer operative to generate one or more control signals for application to the controllable signal combiners and the multi-carrier combiner so as to control assignment of each of at least a subset of the channel elements of the given channel unit board to one or more of the plurality of carriers of the system.

24. A base station for use in a code division multiple access wireless communication system, comprising:

a plurality of channel unit boards each including a plurality of channel elements for providing processing operations for signals received by the system; and

a controllable selector associated with a given one of the channel unit boards and receiving as inputs a set of signals associated with a receive bus of the system, the controllable selector having a plurality of outputs, each coupled to a corresponding input of one of the channel elements of the given channel unit board;

wherein the controllable selector implements an assignment of received signals from each of a plurality of carriers and a plurality of antenna sectors of the system to one or more of the channel elements of the given channel unit board;

wherein a given one of the channel elements of the given channel unit board is assignable to each of the plurality of carriers and the plurality of antenna sectors of the system.

25. The base station of claim 24 wherein each of the channel unit boards processes a set of digital in-phase (I) and quadrature (Q) signals for each of the plurality of carriers.

26. The base station of claim 24 wherein each of at least a subset of the channel unit boards includes a total of N channel elements, and each of the channel elements may be assigned to one of up to N carriers of the system.

27. The base station of claim 24 further including a control computer operative to generate one or more control signals for application to the controllable selector so as to control assignment

of the received signals from each of the plurality of carriers of the system to each of at least a subset of the channel elements of the given channel unit board.

EVIDENCE APPENDIX

None

RELATED PROCEEDINGS APPENDIX

None